



Description Logic

Summer Semester 2022

Exercise Sheet 10

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Exercise 10.1 Consider the $\mathcal{EL}$ TBox

$$\mathcal{T} := \left\{ \begin{array}{l} A \sqsubseteq B \sqcap \exists r.C, \\ B \sqcap \exists r.B \sqsubseteq C \sqcap D, \\ C \sqsubseteq (\exists r.A) \sqcap B, \\ (\exists r.\exists r.B) \sqcap D \sqsubseteq \exists r.(A \sqcap B) \end{array} \right\},$$

where A, B, C, D are concept names. Use the classification procedure for $\mathcal{EL}$ to check whether the following subsumption relationships hold w.r.t. $\mathcal{T}$:

- (a) $A \sqsubseteq B$
- (b) $A \sqsubseteq \exists r.\exists r.A$
- (c) $B \sqcap \exists r.A \sqsubseteq \exists r.C$

Exercise 10.2 Consider the $\mathcal{ELI}$ TBox

$$\mathcal{T} = \{ \begin{array}{l} A_1 \sqcap A_2 \sqsubseteq \exists r.B, \\ \exists r^-.A_2 \sqsubseteq C, \\ A \sqsubseteq A_1 \sqcap A_2, \\ \exists r.(B \sqcap C) \sqsubseteq D \end{array} \},$$

where A, A_1, A_2, B, C, D are concept names. Use the classification procedure for $\mathcal{ELI}$ to check whether the following subsumption relationships hold w.r.t. $\mathcal{T}$:

- (a) $A \sqsubseteq D$
- (b) $\exists r.A \sqsubseteq \exists r.D$
- (c) $A \sqsubseteq \exists r.A$